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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,667	01/22/2002	Norihisa Mino	10873.876US01	8002
53148	7590	02/01/2006	EXAMINER	
HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902-0902 MINNEAPOLIS, MN 55402			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/055,667

Applicant(s)

MINO ET AL.

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 56-67 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 56-67 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. Cancellation of claims 1 – 12, 39 and 40, and addition of claims 56 - 67, filed on October 24, 2005, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. The Examiner notes that the claim designator for claim 67 is incorrect, but that it is clearly "new" since none of claims 56 – 67 were previously presented.

Request for Continued Examination

4. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on October 24, 2005 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 102

5. Claims 56, 57, 59 – 61 and 63 – 65 are rejected under 35 U.S.C. 102(e) as being anticipated by Black et al. (U.S. Patent App. No. 2002/0022111 A).

Regarding claim 56, Black et al. disclose an article comprising particles (*Figure 3, elements 3*), a substrate (*element 1*) and an organic film (*Figure 7D and Paragraphs*

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0078 – 0107), wherein the particles are fixed on the substrate via the organic film (*ibid*), a structure described below by applicants' claimed Markush group is defined by the substrate, the organic film and the particle: particle-X1-R1-Y-R2-X2-substrate, where X1, X2, R1, R2 and Y meet applicants' claimed limitations as described below.

The Examiner notes that Black et al. teach coating the particles with an organic stabilizing material, such as oleic acid (*Paragraph 0078*) or similar compounds of the form R-X, where X can be a carboxylic acid, phosphonic acid, phosphinic acid, sulfonic acid, sulfinic acid and thiol (*Paragraph 0105*). Black et al. further teach coating the substrate with an affinity coating comprising a compound of X-R-Y, where the end-group bonding to the substrate is preferably a Si containing group and the other end group is preferably a carboxylic acid or thiol group, among other reactive groups (*Paragraphs 0080 – 0094*), where the compound is bound to the substrate surface (*Paragraph 0095*).

This yields structures, which would meet applicants claimed limitations given that Black et al. teach that the stabilizing coated particles are bound to the substrate via the affinity coating (*Paragraphs 0078 – 0107*), since X2 = -O-Si- from the affinity coating; R2 = R from the affinity coating; Y =, for example, -O-CO- or -CO-O- from the bond between the R group of the organic stabilizing material R-X (e.g. oleic acid) (*Paragraph 0107*) and the Y group of the affinity coating (*Paragraph 0107*), R1 is the non-end group of the organic stabilizing material R-X (*Paragraph 0105*) and X1 is the end group of the organic stabilizing particle that bonds to the particle, which is taught to be "-S-" (*Paragraph 0105*).

Regarding claim 57, Black et al. disclose single layers of aligned fine particles (*Figures*).

Regarding claim 59, Black et al. disclose particles meeting applicants' size limitations (*Paragraph 0019*).

Regarding claim 60, Black et al. disclose self-assembling films, which are patterned and aligned on the surface of the substrate (*Figure 3 and examples*).

Regarding claim 61, Black et al. disclose particle locations meeting applicants' claimed limitations (*Figure 3*).

Regarding claims 63 - 65, Black et al. disclose particles and substrates meeting applicants' claimed Markush limitations (*Paragraphs 0079 – 0080*).

Claim Rejections - 35 USC § 103

6. Claims 56, 57, 59 – 65 rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al. ('111 A1) as applied above.

Black et al. ('111 A1) is relied upon as described above.

While the Examiner deems that Black et al. describes embodiments anticipating applicants' claimed limitations with sufficient specificity, the Examiner acknowledges that Black et al. fail to explicitly disclose using a "-S-" bond as X1.

However, the Examiner notes that of the X groups listed for the R-X organic stabilizer coating, half of the listed groups are sulfur-containing compounds which would read on applicants' claimed limitation of "-S-". As such the Examiner deems that there is sufficient evidence that compounds that would produce an X1 of "-S-" are equivalent

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to compounds that would produce an X1 or "-OCO-" (i.e. a carboxylate linkage associated with the carboxylic end group of oleic acid – see Paragraphs 0080 and 0107 of Black et al.).

Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, compounds that would produce an X1 of "-S-" and compounds that would produce an X1 or "-OCO-" are equivalents in the field of organic stabilizing compounds applied to the surface of particles. *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

Regarding claims 57, 59 – 61 and 63 – 65, Black et al. disclose the claimed limitations as described above.

Regarding claim 62, Black et al. ('111 A1) teach that the relative sizes of the particles and the width of the concave portion can be varied to effect the recording and bit densities in a patterned magnetic recording medium (*Paragraphs 0097 – 0101 and Figure 3*) as well as for fabricating electronic arrays (*Paragraph 0078*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of the relative values of the width of the concave portion versus the particle size meeting applicants' claimed limitations by optimizing the results effective variable through routine experimentation.

Specifically, the Examiner notes that Black et al. ('111 A1) teach preferred embodiments wherein 9, 16 or even 25 particles (3x3, 4x4 or 5x5 arrays) are located in the concave portions. Since one of ordinary skill in the art would readily possess the

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knowledge that excess space in the concave portion equates to lost recording density, the optimization between the relative width of the concave portion and the particle diameters is deemed to be within the knowledge of one of ordinary skill in the art given the teachings in Black et al. ('111 A1) regarding the effect of particle density on areal recording density.

7. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al. ('111 A1) as applied above in Paragraph 5, and further in view of Black et al. (U.S. Patent No. 6,162,532).

Black et al. ('111 A1) is relied upon as described above.

Black et al. ('111 A1) fail to disclose using accumulated layers of particles versus a single layer.

However, Black et al. ('532) teach that patterned arrays for magnetic recording can comprise multiple layers, wherein each layer is formed in an identical fashion (*Figure 5*) in order to produce a medium possessing multiple recording layers, and hence increased recording density.

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Black et al. ('111 A1) to use multiple layers of aligned particles meeting applicants' claimed limitations as taught by Black et al. ('532) in order to produce a medium possessing multiple recording layers, and hence increased recording density.

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8. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al. ('111 A1) as applied above in Paragraph 6, and further in view of Black et al. (U.S. Patent No. 6,162,532).

Black et al. ('111 A1) is relied upon as described above.

Black et al. ('111 A1) fail to disclose using accumulated layers of particles versus a single layer.

However, Black et al. ('532) teach that patterned arrays for magnetic recording can comprise multiple layers, wherein each layer is formed in an identical fashion (*Figure 5*) in order to produce a medium possessing multiple recording layers, and hence increased recording density.

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Black et al. ('111 A1) to use multiple layers of aligned particles meeting applicants' claimed limitations as taught by Black et al. ('532) in order to produce a medium possessing multiple recording layers, and hence increased recording density.

9. Claims 66 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heath et al. (U.S. Patent No. 6,159,620) in view of Black et al. ('111 A1) as applied above in Paragraph 5.

Regarding claim 66, Heath et al. teach semiconductor devices (*Title*) comprising particles (*Figure 3, element 14*) wherein a barrier layer serving as a tunnel barrier layer

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(*element 12*) provided on a semiconductor substrate (*element 10*) and an electrically insulating layer is provided on the barrier layer and the fine particle layer (*element 16*).

Heath et al. fail to teach a first and second monomolecular organic coating film meeting applicants' claimed limitations.

However, Black et al. ('111 A1) teach a first and second monomolecular film meeting applicants' claimed limitations as described in Paragraph 5 above in order to form uniform, high density patterned arrays possessing good stability (*Paragraph 5 above and Paragraph 0017 in Black et al. '111 A1*).

It would therefore have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify the device of Heath et al. to use a first and second monomolecular coating meeting applicants' claimed limitations as taught by Black et al. ('111 A1) in order to form uniform, high density patterned arrays possessing good stability.

Regarding claim 67, Heath et al. teach semiconductor devices (*Title*) comprising a barrier layer serving as a tunnel barrier layer (*Figure 4, element 28*) between a gate insulating film (*element 32*) and a semiconductor substrate (*element 26*), the barrier layer provided on the semiconductor substrate.

10. Claims 66 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heath et al. (U.S. Patent No. 6,159,620) in view of Black et al. ('111 A1) as applied above in Paragraph 6.

Regarding claim 66, Heath et al. teach semiconductor devices (*Title*) comprising particles (*Figure 3, element 14*) wherein a barrier layer serving as a tunnel barrier layer (*element 12*) provided on a semiconductor substrate (*element 10*) and an electrically insulating layer is provided on the barrier layer and the fine particle layer (*element 16*).

Heath et al. fail to teach a first and second monomolecular organic coating film meeting applicants' claimed limitations.

However, Black et al. ('111 A1) teach a first and second monomolecular film meeting applicants' claimed limitations as described in Paragraph 6 above in order to form uniform, high density patterned arrays possessing good stability (*Paragraph 5 above and Paragraph 0017 in Black et al. '111 A1*).

It would therefore have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify the device of Heath et al. to use a first and second monomolecular coating meeting applicants' claimed limitations as taught by Black et al. ('111 A1) in order to form uniform, high density patterned arrays possessing good stability.

Regarding claim 67, Heath et al. teach semiconductor devices (*Title*) comprising a barrier layer serving as a tunnel barrier layer (*Figure 4, element 28*) between a gate insulating film (*element 32*) and a semiconductor substrate (*element 26*), the barrier layer provided on the semiconductor substrate.

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Response to Arguments

11. The rejection of claims 56 - 67 under 35 U.S.C § 102(e) and/or 103(a) – Black et al. ('111 A1), alone or in view of various references.

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection. In so far as they apply to the rejection of record, the Examiner notes that Black et al. ('111 A1) disclose the claimed invention as described above.


Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
January 16, 2006


Kevin M. Bernatz, PhD
Primary Examiner